

**ABSTRACT OF THE DISCLOSURE**

[000213] A wireless communication receiver (20) comprises an antenna structure (22) and a joint searcher and channel estimator (24). The antenna structure acquires dimensionally differentiated signals which are concurrently utilized by the joint searcher and channel estimator for determining both a time of arrival and channel coefficient. The wireless communication receiver can be either a mobile terminal or a network node (e.g., a radio access network node such as a base station node, also called Node-B). In "spatial" embodiments, the antenna structure comprises an array of plural antennas. The signals acquired by different antennas of the array are dimensionally differentiated with regard to a spatial dimension, and the time of arrival and a composite channel coefficient are essentially concurrently determined by the joint searcher and channel estimator. In "temporal" embodiments, the antenna structure comprises an antenna which provides signals for each of successive sets of pilot data received by the antenna as the dimensionally differentiated signals. In one of its aspects, the joint searcher and channel estimator (24) comprises an antenna signal matrix (80, 110), a correlator (50), and an analyzer (60). Complex values indicative of the dimensionally differentiated signal received in a sampling window are stored in the antenna signal matrix as a function of a sampling window time index and a dimensional differentiation index. The correlator locates value(s) in the antenna signal matrix for use in determining the time of arrival and the channel coefficient. The correlator can utilize non-parametric or parametric techniques for locating "tones" in the antenna signal matrix corresponding to arriving wavefronts. An analyzer uses the value(s) located by the correlator to generate the time of arrival and the channel coefficient.